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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/909,661	07/19/2001	Alexander Jacobson	005388.P006	1818

7590 12/16/2005  
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EXAMINER
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BOUTSIKARIS, LEONIDAS

ART UNIT	PAPER NUMBER
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2872

DATE MAILED: 12/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/909,661

Applicant(s)

JACOBSON, ALEXANDER

Examiner

Leo Boutsikaris

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22, 26, 27, 30 and 31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11, 12, 17-22, 26, 27, 30 and 31 is/are allowed.
- 6) ☒ Claim(s) 1-3, 6, 10 and 13-16 is/are rejected.
- 7) ☒ Claim(s) 4, 5 and 7-9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 January 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Yokoyama (US 5,621,832).

Yokoyama discloses an optical coupler (Fig. 1) comprising:

a housing 35 having a plurality of four ports, each of the four ports coupled to a corresponding one of a plurality of four fibers 31a-31d;

a plurality of collimating lenses, 32a-32d, disposed within the housing, each of the lenses receiving a light beam from a corresponding port;

a beamsplitter 34 coupled to the four collimating lenses to receive the light beam from each of the plurality of the collimating lenses, the beamsplitter having a common optical aperture disposed on an outer surface area to simultaneously receive the light received from each of the four lenses, on the outer surface area of the common optical aperture (lines 16-46, col. 4). It is noted that in both the device of Yokoyama depicted in Fig. 3, and the device of the claimed invention shown in Figs. 2-3, 10, light is received by more than one side of the beamsplitter, in other words the claim language reads on the device of Fig. 3 in Yokoyama.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-3, 6, 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokoyama (US 5,621,832) in view of Optics Guide 5 (Melles Griot).

Regarding claims 2-3, Yokoyama discloses all the limitations of the above claims except for teaching the use of a rhombic prism non-polarizing beamsplitter in place of the beamsplitter plate 34. The Optics Guide by Melles Griot shows typical non-polarizing beamsplitter cubes used in optics (p. 13-9 to 13-12). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a beamsplitter cube instead of a beamsplitter plate in Yokoyama's device, since the latter comprises a plurality of dielectric layers deposited on a substrate, thus requiring a more complex manufacturing process.

Regarding claim 6, any two of the four ports in Fig. 3 can be used as input ports, and the beamsplitter receives light from two of the lenses.

Regarding claim 10, the beamsplitter of Melles Griot is made from high index glass (p. 13-12).

Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokoyama (US 5,621,832).

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Yokoyama discloses all the limitations of the above claims except for specifying that the collimating lenses are GRIN lenses, or the size and the material of the housing. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use GRIN lenses in Yokoyama's coupler, and make the housing from aluminum thermally matched to the beamsplitter, since Official Notice is taken that GRIN lenses are widely used to couple light from and into optical fibers, and that aluminum is used for housing optical components. GRIN lenses are advantageous because of their optimal light coupling efficiency. Finally it is noted that the geometry of Yokoyama's device is inherently small in size compared to other optical couplers (lines 60-67, col. 1).

#### ***Response to Arguments***

Applicant's arguments filed on 9/22/2005 have been fully considered but they are not persuasive.

Regarding claim 1, and Applicant's argument that the beamsplitter in Yokoyama's device receives light from the input beams on different sides of the beamsplitter, as allegedly in contrast to the claimed invention, the examiner respectfully disagrees. Observation of Figs. 2-3, 10 in the disclosure reveals that input light beams may enter the beamsplitter from different sides.

Regarding claim 3, and the argument that the combination of Yokoyama and the Melles Griot reference is inappropriate, the examiner notes that both references are from analogous art, and substitution of the BS plate of Yokoyama with a BS prism would still result in the beam splitting operation disclosed by Yokoyama, with the output beams separated and directed to

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respective optical fibers. BS cubes can be designed to output separate beams at predetermined intensity ratios, thus still fulfilling Yokoyama's stated object of the invention.

***Allowable Subject Matter***

Claims 4-5, 7-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 11-12, 17-22, 26-27, 30-31 are allowed.

Claims 4-5, 7-9, 11-12, 17-22, 26-27, 30-31 are allowable over the prior art of record for at least the reason that even though the prior art discloses optical couplers comprising a non-polarizing beamsplitter having a common optical aperture receiving light from all the input/output ports, or optical couplers comprising a plurality of polarizing beamsplitters, the polarizing beamsplitters having a plurality of optical apertures receiving light from the various ports, the prior art fails to teach or reasonably suggest, regarding claims 4, 17, an apparatus comprising a beamsplitter having a common optical aperture disposed on an outer surface area to simultaneously receive the four light beams, on the outer surface area of the common optical aperture, wherein the beamsplitter comprises a single reflective polarizer plate, regarding claims 5, 7-9, an apparatus comprising a beamsplitter having a common optical aperture disposed on an outer surface area to simultaneously receive the four light beams, on the outer surface area of the common optical aperture, wherein the beamsplitter has a coating on the inner surface to separate the S-polarized and P-polarized components of the light beam into spatially separate beams, regarding claims 11-12, an apparatus comprising a beamsplitter having a common optical

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aperture disposed on an outer surface area to simultaneously receive light from each of the plurality of collimating lenses, wherein the beamsplitter combines into the first output port, S-polarized light from the first input port with P-polarized light from the second input port, and combines into the second output port, S-polarized light from the third input port with P-polarized light from the fourth input port, regarding claims 18-20, an apparatus comprising a beamsplitter having a common optical aperture disposed on an outer surface area to simultaneously receive light from each of the plurality of collimating lenses, wherein the first, second, third and fourth input ports are arranged in one dimensional linear array, or two-dimensional array, regarding claim 21, an apparatus comprising a beamsplitter having a common optical aperture disposed on an outer surface area to simultaneously receive light from each of the plurality of collimating lenses, wherein the beamsplitter prism is constructed from a material comprising birefringent crystal material, regarding claim 22, an apparatus comprising a rhombic prism having a common optical aperture disposed on an outer surface area to simultaneously receive light from each of the plurality of collimating lenses, and separate the S-polarized and P-polarized components of the light beam into spatially separate beams, regarding claims 26-27, a method comprising collimating at least four light beams by a single device having a common optical aperture, reflecting a S-polarized component of each of the at least four light beams and refracting a P-polarized component of each of the at least four light beams using the single device, and regarding claims 30-31, an apparatus comprising means for receiving at least four light beams by a single device having a common optical aperture, means for reflecting a S-polarized component of each of the at least four light beams and refracting a P-polarized component of each of the at least four light beams using the single device, as set forth by the claimed combination.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Leo Boutsikaris whose telephone number is 571-272-2308.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Leo Boutsikaris, Ph.D., J.D.  
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December 12, 2005



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